Cisco ASR 1000 Series Aggregation Services Routers Ordering Guide

This guide provides an overview and guidance on how to order and configure the Cisco® ASR 1000 Series Aggregation Services Routers with their respective hardware components, Cisco IOS® XE Software, and feature licenses. It first addresses ordering of individual components, including hardware, software, and licenses. Several ordering examples, including bundles, of typical deployment then follow. Finally, a list of part numbers, also referred to as Product Identifiers (PIDs), are included. Readers should have some basic knowledge of Cisco ASR 1000 Series Routers and network services, such as router configurations and features required for deployment.

Overview

Cisco ASR 1000 Series Router, a versatile midrange integrated services router, can be deployed in broadband aggregation, enterprise network, service provider edge, IP Radio Access Network (IP RAN), and many other network applications.

When ordering a Cisco ASR 1000 Series Router, consider the following:

- Hardware
  - Chassis: Cisco ASR 1002, 1004, or 1006 models (ASR1002, ASR1004, or ASR1006, respectively)
  - Cisco ASR 1000 Series Route Processor: ASR1000-RP1 or ASR1000-RP2, memory, hard disk, and USB flash memory token
  - Cisco ASR 1000 Series Embedded Services Processor (ESP): 5-,10-, 10-N- and 20-Gbps ESPs (ASR1000-ESP5, ASR1000-ESP10, ASR1000-ESP10-N and ASR1000-ESP20, respectively)
  - Cisco ASR 1000 Series SPA Interface Processors (SIPs): (ASR1000-SIP10)
  - Shared port adapters (SPAs)
- Cisco IOS® XE Software
- Cisco ASR 1000 Series feature licenses

Ordering Cisco ASR 1000 Series Router Hardware

This section discusses how to order Cisco ASR 1000 Series Router hardware, including a Cisco ASR 1000 Series chassis, the route processor (RP) and its modular components, the respective ESPs, the SIP, and—depending on the WAN and LAN connectivity needs—the SPAs.

Chassis

Cisco ASR 1000 Series Routers have three form factors:

- 2RU (Cisco ASR 1002 Router)
- 4RU (Cisco ASR 1004 Router)
- 6RU (Cisco ASR 1006 Router)

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The Cisco ASR 1006 Router supports hardware RP and ESP redundancies, but it does not support software redundancy. Both the Cisco ASR 1002 and 1004 models support dual Cisco IOS software redundancy with the RP1 and RP2. The RP1 requires at least 4 GB of DRAM to support Cisco IOS Software redundancy. The RP2 supports Cisco IOS Software redundancy with its default configuration of 8 GB of DRAM.

Note: A feature license (FLASR1-IOSRED-RTU(=)) is required for software redundancy on the Cisco ASR 1002 and 1004 models.

The Cisco ASR 1002 Router has incorporated a SIP (the carrier card to house SPAs), where the integrated RP1 is located. The RP1 also comes with four built-in Gigabit Ethernet (GE) ports, in addition to the management ports. Furthermore, the Cisco ASR 1002 Router comes with 4GB DRAM by default. If software redundancy is needed, feature license FLASR1-IOSRED-RTU(=) has to be ordered.

Power Supply

All three chassis come by default with either dual AC or dual DC power supplies. A mix of one AC and one DC power supply is not supported. At the time of order, you can choose between dual AC or dual DC power supplies. The power supplies are field-replaceable.

The power supply for a spare chassis is optional, and you need to configure it with the spare chassis or order it separately as a power supply spare.

Note: One or more power supply spares can be ordered separately. Two power supplies are included in the router spare chassis price if configured at the time of order..

Accessory Kit

Every router chassis comes by default with an accessory kit. The accessory kit for a spare chassis is optional, and it needs to be ordered separately.

Route Processor and Its Modular Components

For the Cisco ASR 1004 and 1006 model routers, the route processor needs to be ordered separately. The Cisco ASR 1002 has an embedded route processor. Ordering a separate route processor is not necessary with the Cisco ASR 1002. When ordering a route processor, consider several components:

Memory

The Cisco ASR 1000 Series RP1 *(ASR1000-RP1)* comes with 2GB DRAM as default, and it is upgradable to 4GB DRAM. In order to run dual Cisco IOS Software modules on the RP1 on the Cisco ASR 1004 or Cisco ASR 1006 Router, one *ASR1000-RP1* with the 4-GB DRAM option (M-ASR1K-RP1-4GB), as well as feature license *FLASR1-IOSRED-RTU(=)*, need to be ordered. Additionally, if no dual Cisco IOS Software modules are intended, the upgraded 4GB DRAM can accommodate higher scalability of features, such as more routes or additional MPLS VRFs.

The Cisco ASR 1000 Series RP2 (ASR1000-RP2) comes with 8 GB DRAM as default and is upgradeable to 16GB DRAM. Either the 8 GB DRAM or 16 GB DRAM configured RP2 will run dual Cisco IOS Software modules. The feature license (FLASR1-IOSRED-RTU(=)) needs to be ordered to run Cisco IOS Software redundancy on the RP2. The RP2 provides significant improvements in feature scalability and performance over the RP1, with or without Cisco IOS Software redundancy,

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when configured with the default 8 GB DRAM. With 16 GB DRAM configured, the RP2 provides ultimate control plane performance and scalability for the Cisco ASR 1000 Series platform.

Storage Device

The disk drive on the RP is used for storage purposes, such as IOS XE consolidated package, logs, and core dump files. By default, the RP1 comes with a 40-GB hard disk drive (HDD), and the RP2 comes with an 80-GB hard disk drive (HDD). The HDD is field-replaceable on the RP1 by ordering M-ASR1K-HDD-40GB= . The HDD is field-replaceable on the RP2 by ordering M-ASR1K-HDD-80GB=.

Note: There is no hard disk on the Cisco ASR 1002. Instead, the integrated RP1 on the ASR1002 comes with 8-GB EUSB flash drive for mass storage which is partitioned into 2X32MB for NVRAM and the rest for mass storage. The EUSB drive on the Cisco ASR 1002 is not field-replaceable.

The RP1 comes with a 1GB EUSB flash drive which is partitioned into 2X32MB for NVRAM and the rest for mass storage. The EUSB drive on RP1 is field-replaceable by ordering M-ASR1K-EUSB-1GB=.

The RP2 comes with a 2 GB EUSB flash drive. The EUSB drive on the RP2 is field-replaceable by ordering M-ASR1K-EUSB-2GB=.

USB Flash Token

A 1-GB USB flash token *(MEMUSB-1024FT)* can be ordered separately for Cisco ASR 1000 Series Routers to store configurations or Cisco IOS XE consolidated packages.

Embedded Services Processor (ESP)

Depending on the overall throughput or encryption performance you need, you can choose among three different ESP versions: 5-, 10-, 10-N- and 20-Gbps *(ASR1000-ESP5, ASR1000-ESP10, ASR1000-ESP10-N and ASR1000-ESP20, respectively)*. The 5-Gbps ESP is supported only on Cisco ASR 1002 Routers, whereas the 10-Gbps and 10-N-Gbps ESP's are supported on all three chassis types, the Cisco ASR 1002, 1004, and 1006 models. The 20-Gbps ESP is only supported on Cisco ASR1004 and 1006 models.

Shared Port Adapter Interface Processor (SIP)

You need a carrier card, or SIP *(ASR1000-SIP10)*, to host the SPAs. Every SIP card can host 4 single-height SPAs, or 2 double-height SPAs, or 2 single-height SPAs and 1 double-height SPA. SPA cards on the same SIP card do not need to be of the same type. For instance, one can mix a Gigabit Ethernet SPA, a 10 Gigabit Ethernet SPA, an ATM SPA, a Packet over SONET/SDH (PoS) SPA, or other SPA cards on the same SIP card. Please refer to the *Cisco ASR 1000 Series* data sheet for details on supported SPAs at http://www.cisco.com/go/asr1000.

Shared Port Adaptor

The Cisco ASR 1000 Series supports most Cisco SPAs. For details about the supported SPAs on the Cisco ASR 1000 Series, please refer to the Cisco ASR 1000 Series data sheet, as the list of SPAs will be extended in future Cisco IOS XE Software releases.

Ordering Cisco ASR 1000 Series Router Software

Twelve consolidated packages are provided in each Cisco IOS XE Software release starting with Cisco IOS XE Software release 2.3. Six individual feature sets are available in either a 32-bit version for the RP1 or a 64-bit version for the RP2.

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The available consolidated packages are:

- IP Base w/o crypto
- IP Base
- Advanced IP Services w/o crypto
- Advanced IP Services
- Advanced Enterprise Services w/o crypto
- Advanced Enterprise Services

Series. Table 1 describes the Cisco IOS XE consolidated packages.

Table 1. Cisco IOS XE Consolidated Packages

Cisco IOS XE Consolidated Packages	Image Type	Part Number	Description
Cisco ASR 1000 Series RP1 IP Base w/o crypto	32-bit (RP1)	SASR1R1-IPB	• Offers low-cost base image • Offers only basic IP feature support • Satisfies export requirements for non-cryptographic software
Cisco ASR 1000 Series RP2 IP Base w/o crypto	64-bit (RP2)	SASR1R2-IPB	
Cisco ASR 1000 Series RP1 IP Base	32-bit (RP1)	SASR1R1-IPBK9	• Offers low-cost base image • Offers only basic IP feature support, including Secure Shell (SSH) protocol support
Cisco ASR 1000 Series RP2 IP Base	64-bit (RP2)	SASR1R2-IPBK9	
Cisco ASR 1000 Series RP1 Advanced IP Services w/o crypto	32-bit (RP1)	SASR1R1-AIS	• Targeted for export restricted customers • Supports all features, including Lawful Intercept, and Session Border Controller (SBC) • Does not include encryption (SSH, IP Security [IPsec] Triple Digital Encryption Standard [3DES], and Advanced Encryption Standard [AES]) • Does not include support for legacy protocols
Cisco ASR 1000 Series RP2 Advanced IP Services w/o crypto	64-bit (RP2)	SASR1R2-AIS	
Cisco ASR 1000 Series RP1 Advanced IP Services	32-bit (RP1)	SASR1R1-AISK9	• Targeted for service provider customers • Supports all features, including encryption (SSH, IP Security [IPsec*] Triple Digital Encryption Standard [3DES], and Advanced Encryption Standard [AES]), Lawful Intercept, and Session Border Controller (SBC) • Does not include support for legacy protocols
Cisco ASR 1000 Series RP2 Advanced IP Services	64-bit (RP2)	SASR1R2-AISK9	
Cisco ASR 1000 Series RP1 Advanced Enterprise Services w/o crypto	32-bit (RP1)	SASR1R1-AES	• Targeted for export restricted customers • Supports all features, including Lawful Intercept, and SBC, as well as legacy protocols • Does not support encryption (SSH, IPsec 3DES and AES)
Cisco ASR 1000 Series RP2 Advanced Enterprise Services w/o crypto	64-bit (RP2)	SASR1R2-AES	
Cisco ASR 1000 Series RP1 Advanced Enterprise Services	32-bit (RP1)	SASR1R1-AESK9	• Targeted for enterprise customers • Supports all features, including encryption (SSH, IPsec 3DES and AES), Lawful Intercept, and SBC, as well as legacy protocols
Cisco ASR 1000 Series RP2 Advanced Enterprise Services	64-bit (RP2)	SASR1R2-AESK9	

For more details about these images, please refer to the Cisco IOS Software packaging product bulletin at: http://cisco.com/en/US/products/sw/iosswrel/ps5460/prod_bulletin0900aecd80281b17.html. For

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information about Cisco IOS XE Software, please refer to *Cisco IOS XE Software for Cisco ASR 1000 Series Routers* at: http://www.cisco.com/go/asr1000. In general, if Cisco ASR 1000 Series Routers are deployed in the enterprise environment, the Advanced Enterprise Services consolidated packages should be ordered. If Cisco ASR 1000 Series Routers are deployed in the service provider environment, the Advanced IP Services consolidated packages should be ordered.

Ordering Cisco ASR 1000 Series Router Feature Licenses

In order to turn on services on Cisco ASR 1000 Series Routers, software feature licenses are required, in addition to the appropriate Cisco IOS XE Software as described in the previous section. Currently two types of feature licenses are available: right-to-use (RTU) licenses and number-of-session licenses. Certain services require only RTU license, whereas other services require both RTU license and number-of-session licenses. In the future Cisco will introduce additional feature licenses for other value-added services (for example, intrusion prevention, etc.)

Services that require only an RTU license include the following:

- **IPsec service:** The Cisco ASR 1000 Series Router IPsec application requires a RTU license (FLASR1-IPSEC-RTU(=)), which allows you to enable IPsec 3DES and AES, Dynamic Multipoint VPN (DMVPN), and Easy VPN.
- **Firewall service:** The Cisco ASR 1000 Series Router Firewall application requires a RTU license (FLASR1-FW-RTU(=)), which allows you to enable Layer 4-through-Layer 7 firewalling. To enable per subscriber/user firewall in broadband and enterprise deployments, the firewall RTU license, as well as the number-of-session licenses listed in the "*Broadband service*" section, is required. Please refer to the "*Per subscriber/user firewall service*" section.
- **Flexible Packet Inspection (FPI) service:** The Cisco ASR 1000 Series Router FPI application requires a RTU license (FLASR1-FPI-RTU(=)), which allows you to enable Network Based Application Recognition (NBAR) or Flexible Packet Matching (FPM).
- **Cisco IOS Software redundancy:** The Cisco ASR 1000 Series Router software redundancy requires a RTU license (FLASR1- IOSRED-RTU(=)), which allows you to enable software redundancy on the Cisco ASR 1002 and Cisco ASR 1004 chassis.

Note: Software redundancy requires 4-GB DRAM on the RP1. Cisco ASR1002 by default comes with 4-GB DRAM on the built-in RP1.

Services that require both RTU and Number-of-Session licenses include:

- **Broadband service:** The Cisco ASR 1000 Series Router broadband application requires a RTU license and one or more number-of-session licenses. Unlike on other Cisco products, enabling Intelligent Service Gateway (ISG) technology on Cisco ASR 1000 Series Routers only requires the RTU license (FLASR1-BB-RTU(=)). There is no separate ISG license required other than the broadband RTU license.

  You can combine multiple session licenses for the session count desired; for example, you can purchase two 4,000-session licenses for 8,000 sessions, and you can combine a 16,000-session license with a 4,000-session license for 20,000 sessions. You must order a number-of-session license even if you plan to enable only one session.

  Please note with ASR1000-RP1, the maximum number of sessions is 24,000. To support maximum 32,000 sessions, you will need to order ASR1000-RP2 and ASR1000-ESP20.

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Bundles are created to provide ordering convenience. As of Cisco IOS XE release 2.3, three bundles for broadband services are available:

1. ASR1006-10G-B16/K9 (ASR1006 BB Bundle w/ 2xESP-10G,2xRP1,SIP10,AISK9,16K BB Lic)
2. ASR1006-10G-B24/K9 (ASR1006 BB Bundle w/ 2xESP-10G,2xRP1,SIP10,AISK9,24K BB Lic)
3. ASR1K6R2-20G-B32/K9 (ASR1006 BB Bundle w/ 2xESP-20G,2xRP2,SIP10,AISK9,32K BB Lic)

Bundles 1 and 2 have been available since Cisco IOS XE release 2.2. Bundle 3 is available from Cisco IOS XE release 2.3.

Note: For LAC/LNS functionality, sessions are counted as the number of PPP sessions. The number of L2TP tunnels are not counted as sessions. For L2TS functionality, sessions are counted as the number of L2TP tunnels being switched. For example, if the Cisco ASR 1000 Series Router is used to switch 8000 L2TP tunnels, two 4,000-session licenses (FLASR1-BB-4K(=)) will need to be ordered.

Part numbers for these licenses follow:

- FLASR1-BB-RTU(=)
- FLASR1-BB-4K(=)
- FLASR1-BB-16K(=)
- FLASR1-BB-32K(=)

- **Per subscriber/user firewall service:** The Cisco ASR 1000 Series Router per subscriber/user firewall service requires both a RTU license (FLASR1-FW-RTU(=)), and one or more number-of-session licenses. You can combine multiple number-of-session licenses for the session count desired; for example, you can combine a 16,000-session license with a 4,000-session license for 20,000 sessions. You must order a number-of-session license even if you plan to enable only one session. Part numbers for these licenses follow:
  - FLASR1-FW-RTU(=)
  - FLASR1-BB-4K(=)
  - FLASR1-BB-16K(=)
  - FLASR1-BB-32K(=)
- **SBC service:** The Cisco ASR 1000 Series Router SBC application requires a SBC Base RTU license, one or more copies of SBC advanced feature RTU licenses (such as FLASR1-SBC-H248(=), and one or more number-of-session licenses. You can combine multiple number-of-session licenses for the session count desired; for example, you can combine a 16,000-session license with a 4,000-session license for 20,000 sessions. You must order a number-of-session license even if you plan to enable only one session. In Cisco IOS XE Software Release 2.1, Cisco ASR 1000 Series Routers support only the data-border-element (DBE) function of SBC. Future releases will introduce additional SBC functions that might require other RTU licenses. For details about SBC on Cisco ASR 1000 Series Routers, please refer to *Cisco ASR 1000 Series Routers Session Border Controller* at http://www.cisco.com/go/asr1000. Part numbers for these licenses follow:
  - FLASR1-SBC-RTU(=)
  - FLASR1-SBC-H248(=)

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- FLASR1-SBC-4K(=)
- FLASR1-SBC-16K(=)

Examples

The following examples illustrate how to build a configuration with part numbers for certain network deployments.

Note: These examples are neither exhaustive nor should they be used exactly as presented. You should customize your order based on your needs.

Example 1: Cisco ASR 1000 Series Router as a Broadband Aggregation Router

In this example, a Cisco ASR 1000 Series Router is used for broadband aggregation, such as a Point-to-Point Termination and Aggregation (PTA), or as a IPoE BRAS, or as a L2TP Access Concentrator (LAC), or as a L2TP Network Server (LNS), or as a L2TP Tunnel Switch (L2TS). A 6RU chassis (ASR1006) with redundant RP2s and 20-Gbps ESPs is configured in order to achieve six-9's High Availability. The Cisco ASR 1000 Series RP2 comes by default with an 80-GB hard disk. Three SIP cards are ordered to host 2 double-height 10 Gigabit Ethernet (GE) SPA cards and 4 single-height 8 Gigabit Ethernet (GE) SPA cards.

The Cisco IOS XE Advanced IP Services consolidated package facilitates broadband and Multiprotocol Label Switching (MPLS) features on the router.

A 32,000-subscriber broadband number-of-session license and the broadband RTU license let you scale up to 32,000 subscribers on the system.

Table 2 lists the part numbers for deployment of this scenario.

Table 2. Cisco ASR 1000 Series Router as a Broadband Aggregation Router

Part Number	Product Description	Quantity
ASR1006	Cisco ASR1006 Chassis, Dual P/S	1
ASR1006-PWR-AC	Cisco ASR1006 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-RP2	Cisco ASR1000 Route Processor 2, 8GB DRAM	2
M-ASR1K-HDD-80GB	Cisco ASR1000 RP2 80GB HDD	2
ASR1000-ESP20	Cisco ASR1000 Embedded Services Processor, 20Gbps	2
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	3
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY Shared Port Adapter	2
XFP-10GLR-OC192SR	Multirate XFP module for 10GBASE-LR and OC192 SR-1	2
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	4
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	32
SASR1R2-AISK9-23	Cisco ASR1000 Series RP2ADVANCED IP SERVICES	1
FLASR1-BB-RTU	Broadband Right-To-Use Feature License for ASR1000 Series	1
FLASR1-BB-32K	Broadband 32K Sessions Feature License for ASR1000 Series	1

Alternatively, the ASR1006 broadband bundles can be used to build the same BOM, as shown below.

Table 3. Cisco ASR 1000 Series Router as a Broadband Aggregation Router (with bundle PID)

Part Number	Product Description	Quantity

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ASR1K6R2-20G-B32/K9	ASR1006 BB Bundle w/ 2xESP-20G, 2xRP2, SIP10, AISK9, 32K BB Lic	1
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	2
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY Shared Port Adapter	2
XFP-10GLR-OC192SR	Multirate XFP module for 10GBASE-LR and OC192 SR-1	2
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	4
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	32

Example 2: Cisco ASR 1000 Series Router as a Quad-Play Edge Router

In this example, a Cisco ASR 1000 Series Router provides quad-play services, including voice over IP (VoIP), video conferencing, IPTV, and Internet, to subscribers. A Cisco ASR 1006 chassis with redundant route processors and 20-Gbps ESPs is configured in order to achieve six-9's High Availability. The Cisco ASR 1000 Series RP2 comes with an 80-GB hard disk. Three SIP cards are ordered to host 2 full-height 10 Gigabit Ethernet SPA cards and 4 half-height 8 Gigabit Ethernet SPA cards.

The Cisco IOS XE Advanced IP Services consolidated package facilitates broadband, SBC, and MPLS features on the router.

A 16,000-subscriber broadband number-of-session license and broadband RTU license are ordered to scale up to 16,000 broadband subscribers on the Cisco ASR 1000 Series Router. In addition, SBC licenses are required to enable the SBC services: SBC Base RTU and SBC H248 RTU licenses, in addition to 2 copies of 4,000-subscriber SBC number-of-session license (FLASR1-SBC-4K(=)), if you only plan to scale up to 8,000 SBC sessions on the router.

Table 4. Cisco ASR 1000 Series Router as a Quadruple-Play Edge Router

Part Number	Product Description	Quantity
ASR1006	Cisco ASR1006 Chassis, Dual P/S	1
ASR1006-PWR-AC	Cisco ASR1006 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-RP2	Cisco ASR1000 Route Processor 2, 8GB DRAM	2
M-ASR1K-HDD-80GB	Cisco ASR1000 RP2 80GB HDD	2
ASR1000-ESP20	Cisco ASR1000 Embedded Services Processor, 20G,Crypto	2
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	3
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY Shared Port Adapter	2
XFP-10GLR-OC192SR	Multirate XFP module for 10GBASE-LR and OC192 SR-1	2
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	4
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	32
SASR1R1-AISK9	Cisco ASR1000 Series RP1 ADVANCED IP SERVICES	1
FLASR1-BB-RTU	Broadband Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-BB-16K	Broadband 16K Sessions Feature Lic for ASR1000 Series	1
FLASR1-SBC-RTU	SBC Base Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-SBC-H248	SBC H248 Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-SBC-4K	SBC 4K Sessions Feature Lic for ASR1000 Series	2

Example 3: Cisco ASR 1000 Series Router as a LNS Router with per subscriber firewall

In this example, a Cisco ASR 1000 Series Router provides per subscriber firewall service to end users on a LNS router. A Cisco ASR 1006 chassis with redundant route processors and 10-Gbps ESPs is configured in order to achieve six-9's High Availability. The Cisco ASR 1000 Series RP1

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comes with a 40-GB hard disk. Three SIP cards are ordered to host 2 full-height 10 Gigabit Ethernet SPA cards and 4 half-height 8 Gigabit Ethernet SPA cards.

The Cisco IOS XE Advanced IP Services consolidated package facilitates broadband, firewall, and MPLS features on the router.

A 16,000-subscriber broadband number-of-session license, in addition to the broadband and firewall RTU license, is ordered to scale up to 16,000 broadband subscribers and provide per subscriber firewall services to the end users on the Cisco ASR 1000 Series Router.

Table 5. Cisco ASR 1000 Series Router as a LNS Router with per subscriber firewall

Part Number	Product Description	Quantity
ASR1006	Cisco ASR1006 Chassis, Dual P/S	1
ASR1006-PWR-AC	Cisco ASR1006 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM	2
M-ASR1K-HDD-40GB	Cisco ASR1000 RP1 40GB HDD	2
ASR1000-ESP10	Cisco ASR1000 Embedded Services Processor, 10G,Crypto	2
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	3
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY Shared Port Adapter	2
XFP-10GLR-OC192SR	Multirate XFP module for 10GBASE-LR and OC192 SR-1	2
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	4
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	32
SASR1R1-AISK9	Cisco ASR1000 Series RP1 ADVANCED IP SERVICES	1
FLASR1-BB-RTU	Broadband Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-FW-RTU	Firewall Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-BB-16K	Broadband 16K Sessions Feature Lic for ASR1000 Series	1

Alternatively, the ASR1006 broadband bundles can be used to build the same BOM, as shown below.

Table 6. Cisco ASR 1000 Series Router as a LNS Router with per subscriber firewall (with bundle PID)

Part Number	Product Description	Quantity
ASR1006-10G-B16/K9	ASR1006 BB Bundle w/ 2xESP-10G, 2xRP1, SIP10, AISK9, 16K BB Lic	1
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	2
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY Shared Port Adapter	2
XFP-10GLR-OC192SR	Multirate XFP module for 10GBASE-LR and OC192 SR-1	2
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	4
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	32
FLASR1-FW-RTU	Firewall Right-To-Use Feature Lic for ASR1000 Series	1

Example 4: Cisco ASR 1000 Series Router as High-End Customer Premises Equipment

In this example, a Cisco ASR 1000 Series Router is used as managed high-end customer premises equipment (CPE). A 2RU chassis with a 5-Gbps ESP is configured because of its great price/performance.

The Cisco ASR 1002 comes with 4 built-in Gigabit Ethernet ports and 4-GB DRAM by default. The SIP card and the route processor are built into the chassis. The 3-slot 2RU chassis can host up to 3

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SPAs; in other words, it can host 2 single-height Channelized T3 to DS0 SPA cards and 1 single-height 8-port Fast Ethernet SPA card.

The Cisco IOS XE Advanced Enterprise Services consolidated package facilitates IPsec, firewall, and other advanced features on the router.

IPsec and firewall RTU licenses allow service providers to provide advanced services such as IPsec and firewall service to their end customers.

Table 7 lists the part numbers for deployment of this scenario.

Table 7. Cisco ASR 1000 Series Router as High-End Customer Premises Equipment

Part Number	Product Description	Quantity
ASR1002	Cisco ASR1002 Chassis,4 built-in GE, Dual P/S,4GB DRAM	1
ASR1002-PWR-AC	Cisco ASR1002 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-ESP5	ASR1K Embedded Services Processor,5Gbps,Crypto,ASR1002 only	1
SPA-4XCT3/DS0	4-port Channelized T3 to DS0 Shared Port Adapter	2
SPA-8X1FE-TX-V2	Cisco 8-Port Fast Ethernet (TX) Shared Port Adapter	1
SASR1R1-AESK9	Cisco ASR1000 Series RP1 ADVANCED ENTERPRISE SERVICES	1
FLASR1-IPSEC-RTU	Encryption Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-FW-RTU	Firewall Right-To-Use Feature Lic for ASR1000 Series	1

Alternatively, the ASR1002 security bundles can be used to build the same BOM, as shown below.

Table 8. Cisco ASR 1000 Series Router as High-End Customer Premises Equipment (with bundle PID)

Part Number	Product Description	Quantity
ASR1002-5G-SEC/K9	ASR1002 VPN+FW Bundle w/ ESP-5G, AESK9, License, 4GB DRAM	1
SPA-4XCT3/DS0	4-port Channelized T3 to DS0 Shared Port Adapter	2
SPA-8X1FE-TX-V2	Cisco 8-Port Fast Ethernet (TX) Shared Port Adapter	1

Example 5: Cisco ASR 1000 Series Router as a Provider Edge Router

In this example, a Cisco ASR 1000 Series Router is used as a provider edge router in a service provider network. A 6RU chassis with redundant route processors and ESPs is configured in order to achieve six-9's High Availability. The Cisco ASR 1000 Series RP2 comes with an 80-GB hard disk.

Three SIP cards are ordered to host 2 full-height 10 Gigabit Ethernet SPA cards and 4 half-height 8-port Gigabit Ethernet SPA cards.

A Cisco IOS XE Advanced IP Services consolidated package facilitates MPLS and other advanced features on the router.

Table 9 lists the part numbers for deployment of this scenario.

Table 9. Table 5 Cisco ASR 1000 Series Router as a Provider Edge Router

Part Number	Product Description	Quantity
ASR1006	Cisco ASR1006 Chassis, Dual P/S	1
ASR1006-PWR-AC	Cisco ASR1006 AC Power Supply	2
Part number depends on required power cable	Power Cable	2

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Part Number	Product Description	Quantity
ASR1000-RP2	Cisco ASR1000 Route Processor 2, 8GB DRAM	2
M-ASR1K-HDD-80GB	Cisco ASR1000 RP2 80GB HDD	2
ASR1000-ESP20	Cisco ASR1000 Embedded Services Processor, 20G,Crypto	2
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	3
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY Shared Port Adapter	2
XFP-10GLR-OC192SR	Multirate XFP module for 10GBASE-LR and OC192 SR-1	2
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	4
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	32
SASR1R1-AISK9	Cisco ASR1000 Series RP1 ADVANCED IP SERVICES	1

Example 6: Cisco ASR 1000 Series Router as a Route Reflector

In this example, a Cisco ASR 1000 Series Router is used as a route reflector because of its high and scalable control-plane performance. A Cisco ASR 1004 chassis with an RP2 and a 10-Gbps ESP is configured because of its great price/performance ratio.

The Cisco ASR 1004 and Cisco IOS Software redundancy RTU license (FLASR1-IOSRED-RTU) allow configuration of software redundancy.

A Cisco IOS XE Advanced IP Services consolidated package facilitates Border Gateway Protocol (BGP), Multiprotocol BGP (MBGP), MPLS, and other advanced features on the router.

Table 10 lists the part numbers for deployment of this scenario.

Table 10. Cisco ASR 1000 Series Router as a Route Reflector

Part Number	Product Description	Quantity
ASR1004	Cisco ASR1004 Chassis, Dual P/S	1
ASR1004-PWR-AC	Cisco ASR1004 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-ESP10	Cisco ASR1000 Embedded Services Processor, 10G,Crypto	1
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	1
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	1
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	8
SASR1R1-AISK9	Cisco ASR1000 Series RP1 ADVANCED IP SERVICES	1
FLASR1-IOSRED-RTU	SW Redundancy Right-To-Use Feat Lic for ASR1000 Series	1

Example 7 Cisco ASR 1000 Series Router as a Secure Headend Router

In this example, a Cisco ASR 1000 Series Router is used as secure headend router in an enterprise network. A 6RU chassis with redundant route processors and ESPs is configured in order to achieve six-9's High Availability. The Cisco ASR 1000 Series RP1 comes with a 40-GB hard disk.

One SIP card is ordered to host 1 single-height 5-port Gigabit Ethernet SPA card and 1 single-height PoS OC-12 SPA card.

A Cisco IOS XE Advanced Enterprise consolidated package facilitates advanced security features on the router.

Table 11 lists the part numbers for deployment of this scenario.

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Table 11. Cisco ASR 1000 Series Router as a Secure Headend Router

Part Number	Product Description	Quantity
ASR1006	Cisco ASR1006 Chassis, Dual P/S	1
ASR1006-PWR-AC	Cisco ASR1006 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM	2
M-ASR1K-HDD-40GB	Cisco ASR1000 RP1 40GB HDD	2
ASR1000-ESP10	Cisco ASR1000 Embedded Services Processor, 10G,Crypto	2
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	2
SPA-1XOC12-POS	1-port OC12/STM4 POS Shared Port Adapters	1
SFP-OC12-LR1	OC-12/ STM-4 SFP, Long Reach (40km)	1
SPA-5X1GE-V2	Cisco 5-Port Gigabit Ethernet Shared Port Adapter	1
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	5
SASR1R1-AESK9	Cisco ASR1000 Series RP1 ADVANCED ENTERPRISE SERVICES	1
FLASR1-IPSEC-RTU	Encryption Right-To-Use Feature Lic for ASR1000 Series	1

Example 8: Cisco ASR 1000 Series Router as an Internet Gateway Router

In this example, a Cisco ASR 1000 Series Router is used as an Internet gateway router in an enterprise network. A 4RU router (Cisco ASR 1004) chassis is configured. The Cisco ASR 1000 Series RP1 is upgraded to 4-GB memory and the Cisco IOS Software redundancy RTU license (FLASR1-IOSRED-RTU) allows you to configure software redundancy.

One SIP card is ordered to host 1 single-height 8-port Gigabit Ethernet SPA card.

A Cisco IOS XE Advanced Enterprise consolidated package facilitates advanced security features on the router.

Firewall, IPSec, and FPI RTU licenses facilitate firewall, IPSec, NBAR, and FPM functions on the router.

Table 12 lists the part numbers for deployment of this scenario.

Table 12. Cisco ASR 1000 Series Router as an Internet Gateway Router

Part Number	Product Description	Quantity
ASR1004	Cisco ASR1004 Chassis, Dual P/S	1
ASR1004-PWR-AC	Cisco ASR1004 AC Power Supply	2
Part number depends on required power cable	Power Cable	2
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM	1
M-ASR1K-RP1-4GB	Cisco ASR1000 RP1 4GB DRAM	1
M-ASR1K-HDD-40GB	Cisco ASR1000 RP1 40GB HDD	1
ASR1000-ESP10	Cisco ASR1000 Embedded Services Processor, 10G,Crypto	1
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10	1
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	1
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	5
SASR1R1-AESK9	Cisco ASR1000 Series RP1 ADVANCED ENTERPRISE SERVICES	1
FLASR1-IOSRED-RTU	SW Redundancy Right-To-Use Feat Lic for ASR1000 Series	1
FLASR1-FW-RTU	Firewall Right-To-Use Feature Lic for ASR1000 Series	1
FLASR1-IPSEC-RTU	Encryption Right-To-Use Feature Lic for ASR1000 Series	1

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FLASR1-FPI-RTU	Flex. Pack Insp. Right-To-Use Feat Lic,ASR1000 Series	1

Alternatively, the ASR1004 security + high availability bundles can be used to build the same BOM, as shown below.

Table 13. Cisco ASR 1000 Series Router as an Internet Gateway Router (with bundle PID)

Part Number	Product Description	Quantity
ASR1004-10G-SHA/K9	ASR1004 Sec+HA Bundle w/ ESP-10G, RP1, SIP10, AESK9, License	1
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet Shared Port Adapter	1
SFP-GE-L	1000BASE-LX/LH SFP (DOM)	8

Ordering Information

Table 14 lists most of the part numbers you need for a Cisco ASR 1000 Series Router. For more details and available bundles, please contact your local Cisco account representative. For supported SPAs, please refer to the *Cisco ASR 1000 Series* data sheet at: http://www.cisco.com/go/asr1000.

Table 14. Ordering Information

Product Number	Product Description
Cisco ASR 1000 Series Chassis	
ASR1002	Cisco ASR1002 Chassis, 4 built-in GE, Dual P/S, 4GB DRAM
ASR1002=	Cisco ASR1002 Chassis, 4 built-in GE, 4GB DRAM, spare
ASR1004	Cisco ASR1004 Chassis, Dual P/S
ASR1004=	Cisco ASR1004 Chassis, spare
ASR1006	Cisco ASR1006 Chassis, Dual P/S
ASR1006=	Cisco ASR1006 Chassis, spare
Cisco ASR 1000 Series Embedded Services Processor	
ASR1000-ESP5	ASR1K Embedded Services Processor, 5Gbps,Crypto, ASR1002 only
ASR1000-ESP5=	ASR1K Embedded Services Processor, 5G,Crypto, 1002 only, spare
ASR1000-ESP10	Cisco ASR1000 Embedded Services Processor, 10G,Crypto
ASR1000-ESP10=	Cisco ASR1000 Embedded Services Processor, 10G,Crypto, Spare
ASR1000-ESP10-N	Cisco ASR1000 Embedded Services Processor, 10G, Non Crypto
ASR1000-ESP10-N=	Cisco ASR1000 Embedded Services Processor, 10G, Non Crypto, Spare
ASR1000-ESP20	Cisco ASR1000 Embedded Services Processor, 20G,Crypto
ASR1000-ESP20=	Cisco ASR1000 Embedded Services Processor, 20G,Crypto, Spare
Cisco ASR 1000 Series Route Processor	
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM
ASR1000-RP1=	Cisco ASR1000 Route Processor 1, 2GB DRAM, Spare
ASR1000-RP2	Cisco ASR1000 Route Processor 2, 8GB DRAM
ASR1000-RP2=	Cisco ASR1000 Route Processor 2, 8GB DRAM, Spare
Cisco ASR 1000 Series SPA Interface Processor	
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10
ASR1000-SIP10=	Cisco ASR1000 SPA Interface Processor 10,Spare
Cisco ASR 1000 Series RP1 Memory	
M-ASR1K-RP1-2GB	Cisco ASR1000 RP1 2GB DRAM
M-ASR1K-RP1-2GB=	Cisco ASR1000 RP1 2GB DRAM, spare
M-ASR1K-RP1-4GB	Cisco ASR1000 RP1 4GB DRAM
M-ASR1K-RP1-4GB=	Cisco ASR1000 RP1 4GB DRAM, spare

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Product Number	Product Description
M-ASR1K-HDD-40GB	Cisco ASR1000 RP1 40GB HDD
M-ASR1K-HDD-40GB=	Cisco ASR1000 RP1 40GB HDD, spare
M-ASR1K-SSD-32GB	Cisco ASR1000 RP1 32GB SSD
M-ASR1K-SSD-32GB=	Cisco ASR1000 RP1 32GB SSD, spare
Cisco ASR 1000 Series RP2 Memory	
M-ASR1K-RP2-8GB	Cisco ASR1000 RP2 8GB DRAM
M-ASR1K-RP2-8GB=	Cisco ASR1000 RP2 8GB DRAM, Spare
M-ASR1K-RP2-16GB	Cisco ASR1000 RP2 16GB DRAM
M-ASR1K-RP2-16GB=	Cisco ASR1000 RP2 16GB DRAM, Spare
M-ASR1K-HDD-80GB=	Cisco ASR1000 RP2 80GB HDD,spare
M-ASR1K-EUSB-2GB=	Cisco ASR1000 RP2 2GB EUSB+ FLASH,SPARE
Cisco ASR 1000 Series USB Flash Memory Options	
MEMUSB-1024FT	1GB USB Flash Token for Cisco ASR 1000 Series
MEMUSB-1024FT=	1GB USB Flash Token for Cisco ASR 1000 Series, spare
Cisco ASR 1000 Series Software*	
SASR1R1-AES-23SR	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE W/O CRYPTO
SASR1R1-AESK9-23SR	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES
SASR1R1-AIS-23SR	Cisco ASR 1000 Series RP1 ADVANCED IP SERVICES W/O CRYPTO
SASR1R1-AISK9-23SR	Cisco ASR 1000 Series RP1 ADVANCED IP SERVICES
SASR1R1-IPB-23SR	Cisco ASR 1000 Series RP1 IP BASE W/O CRYPTO
SASR1R1-IPBK9-23SR	Cisco ASR 1000 Series RP1 IP BASE
SASR1R2-AES-23SR	Cisco ASR 1000 Series RP2 ADVANCED ENTERPRISE W/O CRYPTO
SASR1R2-AESK9-23SR	Cisco ASR 1000 Series RP2 ADVANCED ENTERPRISE SERVICES
SASR1R2-AIS-23SR	Cisco ASR 1000 Series RP2 ADVANCED IP SERVICES W/O CRYPTO
SASR1R2-AISK9-23SR	Cisco ASR 1000 Series RP2 ADVANCED IP SERVICES
SASR1R2-IPB-23SR	Cisco ASR 1000 Series RP2 IP BASE W/O CRYPTO
SASR1R2-IPBK9-23SR	Cisco ASR 1000 Series RP2 IP BASE
Cisco ASR 1000 Series Software Spare	
ASR1000-SW-SPARECD	Cisco ASR 1000 Series Software Spare CD
Cisco ASR 1000 Series CD Feature Packs	
CDASR1000R1-IPB=	Cisco ASR1000 RP1 IP Base w/o crypto, spare
CDASR1000R1-IPBK9=	Cisco ASR1000 RP1 IP Base, spare
CDASR1000R1-AISK9=	Cisco ASR1000 RP1 Advanced IP Services, spare
CDASR1000R1-AESK9=	Cisco ASR1000 RP1 Advanced Enterprise Services, spare
Cisco ASR 1000 Series Licenses—Security	
FLASR1-IPSEC-RTU=	Encryption Right-To-Use Feature Lic for ASR1000 Series, spare
FLASR1-IPSEC-RTU	Encryption Right-To-Use Feature Lic for ASR1000 Series
FLASR1-FW-RTU=	Firewall Right-To-Use Feature Lic for ASR1000 Series, spare
FLASR1-FW-RTU	Firewall Right-To-Use Feature Lic for ASR1000 Series
FLASR1-FPI-RTU=	Flex. Pack Insp. Right-To-Use Feat Lic, ASR1000 Series, spare
FLASR1-FPI-RTU	Flex. Pack. Insp. Right-To-Use Feat Lic for ASR1000 Series
Cisco ASR 1000 Series Licenses—High Availability	
FLASR1-IOSRED-RTU=	SW Redundancy Right-To-Use Feat Lic for ASR1000 Series, spare
FLASR1-IOSRED-RTU	SW Redundancy Right-To-Use Feat Lic for ASR1000 Series

* For part numbers of specific releases, please refer to Cisco ASR 1000 Series Global Price List

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Product Number	Product Description
Cisco ASR 1000 Series Licenses—Broadband	
FLASR1-BB-RTU=	Broadband Right-To-Use Feature Lic for ASR1000 Series, spare
FLASR1-BB-RTU	Broadband Right-To-Use Feature Lic for ASR1000 Series
FLASR1-BB-4K=	Broadband 4K Sessions Feature Lic for ASR1000 Series, spare
FLASR1-BB-4K	Broadband 4K Sessions Feature Lic for ASR1000 Series
FLASR1-BB-16K=	Broadband 16K Sessions Feature Lic for ASR1000 Series, spare
FLASR1-BB-16K	Broadband 16K Sessions Feature Lic for ASR1000 Series
FLASR1-BB-32K=	Broadband 32K Sessions Feature Lic for ASR1000 Series, spare
FLASR1-BB-32K	Broadband 32K Sessions Feature Lic for ASR1000 Series
Cisco ASR 1000 Series Licenses—Session Border Controller	
FLASR1-SBC-RTU=	SBC Base Right-To-Use Feature Lic for ASR1000 Series, spare
FLASR1-SBC-RTU	SBC Base Right-To-Use Feature Lic for ASR1000 Series
FLASR1-SBC-H248=	SBC H248 Right-To-Use Feature Lic for ASR1000 Series, spare
FLASR1-SBC-H248	SBC H248 Right-To-Use Feature Lic for ASR1000 Series
FLASR1-SBC-4K=	SBC 4K Sessions Feature Lic for ASR1000 Series, spare
FLASR1-SBC-4K	SBC 4K Sessions Feature Lic for ASR1000 Series
FLASR1-SBC-16K=	SBC 16K Sessions Feature Lic for ASR1000 Series, spare
FLASR1-SBC-16K	SBC 16K Sessions Feature Lic for ASR1000 Series
Cisco ASR 1000 Series Power Supply	
ASR1002-PWR-AC	Cisco ASR1002 AC Power Supply
ASR1002-PWR-AC=	Cisco ASR1002 AC Power Supply, Spare
ASR1004-PWR-AC	Cisco ASR1004 AC Power Supply
ASR1004-PWR-AC=	Cisco ASR1004 AC Power Supply, Spare
ASR1006-PWR-AC	Cisco ASR1006 AC Power Supply
ASR1006-PWR-AC=	Cisco ASR1006 AC Power Supply, Spare
ASR1002-PWR-DC	Cisco ASR1002 DC Power Supply
ASR1002-PWR-DC=	Cisco ASR1002 DC Power Supply, Spare
ASR1004-PWR-DC	Cisco ASR1004 DC Power Supply
ASR1004-PWR-DC=	Cisco ASR1004 DC Power Supply, Spare
ASR1006-PWR-DC	Cisco ASR1006 DC Power Supply
ASR1006-PWR-DC=	Cisco ASR1006 DC Power Supply, Spare
Cisco ASR 1000 Series Accessories	
ASR1006-ACS=	Cisco ASR1006 Accessory Kit, Spare
ASR1006-ACS	Cisco ASR1006 Accessory Kit,
ASR1004-ACS=	Cisco ASR1004 Accessory Kit, Spare
ASR1004-ACS	Cisco ASR1002 Accessory Kit
ASR1002-ACS=	Cisco ASR1002 Accessory Kit, Spare
ASR1002-ACS	Cisco ASR1006 Accessory Kit
SPA-BLANK=	Blank Cover for regular SPA
ASR1000-SIP-BLANK=	Blank Cover ASR1000 SIP, Spare
ASR1000-ESP-BLANK=	Blank Cover for ASR1000 ESP, spare
ASR1000-RP-BLANK=	Blank Cover for ASR1000 RP, spare

For a complete list of Cisco ASR1000 bundles, such as broadband bundles, security bundles, high availability bundles, and etc, please refer to the pricing tool or contact your local Cisco account team.

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